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Taxonomic notes on some Palaearctic *Colletes* bees (Insecta: Hymenoptera: Colletidae)

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A b s t r a c t : The taxonomic status of *Colletes edentulus* NOSKIEWICZ 1936 and *C. ravulus* NOSKIEWICZ 1936 is discussed with special reference to Mongolia. The female of *C. edentulus* is described. Females of a poorly known *Colletes* species from Mongolia are described, their relationships discussed, and interpreted tentatively as part of *C. ravulus* NOSKIEWICZ 1936. The female of *C. indicus* KUHLMANN 2003 from India is described for the first time.

K e y w o r d s : *Colletes*, bees, taxonomy, Palaearctic region.

Introduction

In recent years I have received many unidentified *Colletes* bees from different parts of Asia. In combination with previous studies of the Mongolian *Colletes* fauna (KUHLMANN & DORN 2002, KUHLMANN 2009), this new material now helps to solve long-standing problems in the taxonomy of the *C. fodiens*-group. Also the hitherto unknown female of a species of the *C. marginatus*-group from India has been discovered and is described here.

Colletes fodiens-group

The *C. fodiens*-group comprises 16 species and four subspecies. It is notorious for problems in the identification, especially of the females, which often depends on subtle differences in punctuation of metasomal terga and the surface structure of the clypeus. The least known species of the group are *C. edentulus* NOSKIEWICZ 1936 and *C. ravulus* NOSKIEWICZ 1936.

C. ravulus was described by NOSKIEWICZ (1936), based on a single male collected 1892 by Leder in northern Mongolia. The type is lost (KUHLMANN 2000), but the detailed description and the characteristically shaped 7th sternum still enables a reliable identification. However, despite extensive bee collecting in Mongolia since at least the early 1960s, no male of the species has been found since (KUHLMANN & DORN 2002, KUHLMANN 2009).

NOSKIEWICZ (1936) described *C. edentulus* from two males collected by Reitter in the "Araxestal" (valley of the river Aras that partly forms the border between Turkey, Armenia, Azerbaijan and Iran). He stated that he could not reliably distinguish the females of

C. edentulus and the closely related *C. tuberculatus* MORAWITZ 1894 and therefore gave no description of the female. Examination of the type material of *C. edentulus* housed in the Natural History Museum in Vienna (KUHLMANN 2000) showed that the males were collected in 1889, while the female was found one year later in 1890. The exact collecting sites and dates were not given on the labels. But because the Aras valley covers a vast area, that males and female were collected in different years, and that both *C. edentulus* and *C. tuberculatus* are known to occur in this region, it has remained doubtful whether the female specimen really belongs to *C. edentulus*, or whether it is in fact a female of *C. tuberculatus*. The latter interpretation would explain why no differences between the females of both ‘species’ could be found, either by NOSKIEWICZ (1936) or when I examined the specimens.

Additional male specimens of *C. edentulus* were collected in Mongolia by the Mongolian-German Biological Expeditions in 1977 (KUHLMANN & DORN 2002) and later I received females of an unknown species that I provisionally assigned to *C. edentulus* (KUHLMANN 2009). However, the two sexes were not collected together, still leaving doubt concerning their affiliation. Finally I received from the American Museum of Natural History, New York, a series of 11 females and 4 males of *C. edentulus* collected at a nesting site in eastern Turkey (Erzurum, 2 km E of jct. of Oltu and Tortum Hways at Su, Kavusumu, 29.vii.2008, leg. J.S. Ascher, J.G. Rozen, H. Özbek; specimens in AMNH and research collection KUHLMANN). For the first time, this allowed examination of both sexes of *C. edentulus* that are reliably associated.

As a result, it became clear that the females from Turkey are different from the female studied by NOSKIEWICZ (1936), clarifying that the female type of *C. edentulus* indeed belongs to *C. tuberculatus*, as previously suspected. Furthermore, the female *C. edentulus* from Turkey, described below, shows clear differences from the females from Mongolia that were earlier assigned to this species (Kuhlmann 2009). Very probably the Mongolian specimens represent the unknown female of the lost *C. ravulus* and these are described below. However, it cannot be excluded that these females belong to another unknown species and therefore I hope for additional material from which to assess these possibilities.

Females of the *C. fodiens*-group show close resemblance to each other, so that descriptions are restricted to the differences between them and *C. tuberculatus*, which has been described in detail by NOSKIEWICZ (1936).

***Colletes edentulus* NOSKIEWICZ 1936**

Colletes edentulus NOSKIEWICZ 1936 - NOSKIEWICZ 1936: 329-330.

Description of female: The female of *C. edentulus* differs from *C. tuberculatus* only in the sculpture of the clypeus, the punctuation of the terga, and the width of posterior tergal hair bands. In *C. edentulus*, the punctuation of the clypeus is finer and the punctures are more rounded apically (Fig. 2) than in *C. tuberculatus* (Fig. 1). The posterior hair band of T1 is slightly broader in *C. edentulus* (Fig. 5) than in *C. tuberculatus* (Fig. 4), and the surface of T1 is flatter and slightly irregular as the light reflections show (Fig. 5), whereas in *C. tuberculatus* T1 is regularly convex (Fig. 4). Punctuation on the disc of T1 is similar in both species, but in *C. tuberculatus* it becomes progressively smaller and denser towards the apex but is still distinct (Fig. 4), whereas in *C. edentulus* the apical punctuation is indistinct, more dispersed, and slightly larger (Fig. 5).

***Colletes ravulus* NOSKIEWICZ 1936**

Colletes ravulus NOSKIEWICZ 1936 - NOSKIEWICZ 1936: 335-337.

The specimens assigned to *C. edentulus* in KUHLMANN (2009) all belong to *C. ravulus* as understood here.

Description of female: *Colletes ravulus* and *C. tuberculatus* differ only in the sculpture of the clypeus and in the punctuation of the terga. In *C. ravulus*, the distance between the punctures of the clypeus is slightly broader (Fig. 3) than in *C. tuberculatus* (Fig. 1), but the sculpture is otherwise identical. In *C. ravulus*, the punctuation on the disc of T1 is much denser and the punctures are slightly smaller (Fig. 6) than in *C. tuberculatus* (Fig. 4). In both species the punctuation becomes much smaller and denser apically, but more so in *C. ravulus* (Fig. 6).

***Colletes marginatus*-group**

This group comprises six species. As in the *C. fodiens*-group, the females are difficult to identify because differences are often subtle in the punctuation of the metasomal terga, in the surface structure of the clypeus, and in the pilosity. Only based on recent extensive material collected in Mongolia was it possible to recognize *C. pallescens* NOSKIEWICZ 1936 as a synonym of *C. chengtehensis* YASUMATSU 1935 (KUHLMANN 2009), illustrating the taxonomic problems in this group.

***Colletes indicus* KUHLMANN 2003**

Colletes indicus KUHLMANN 2003 - KUHLMANN 2003b: 895.

This species was described based on a single male collected in the Nilgiri Hills near Coonoor (KUHLMANN 2003). Recently I received a male and female of *C. indicus* that had been collected together by M. HALADA on 26.iv.2005 near the type locality in Pakyra, Nilgiri Hills ($N11^{\circ}29.9'$ $E76^{\circ}36.9'$), 2250 m (research collection KUHLMANN). This permits the description of the hitherto unknown female.

Description of female: The females of the *marginatus*-group are very similar and *C. indicus* closely resembles the other species in general habitus (Fig. 7). But like the male (Kuhlmann 2003), it is morphologically isolated within the species-group and shows some character states that distinguish *C. indicus* from all of its relatives: the edge of the pre-occipital area behind the eyes is weakly developed and not as sharply angled as in the other species; the punctuation of the clypeus is much coarser, with the punctures less clearly delimited and about twice the size of those of its relatives, giving the clypeus a more shiny appearance (Fig. 8); the punctuation on the disc of T1 is more dispersed and the punctures are more than twice as wide as in the other species (Fig. 9).

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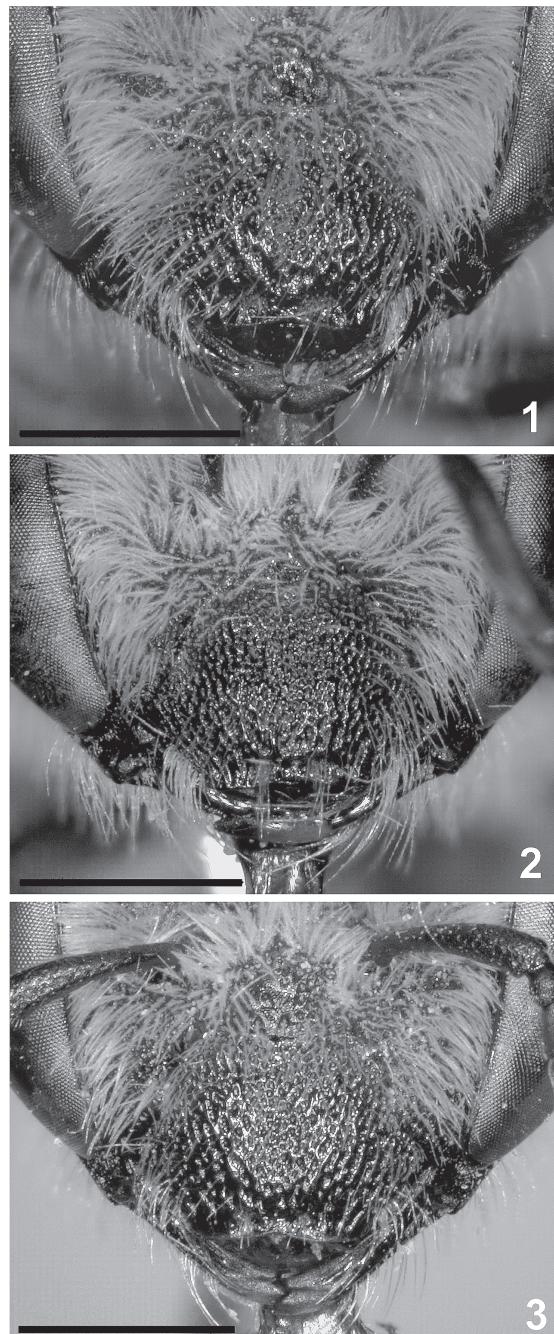
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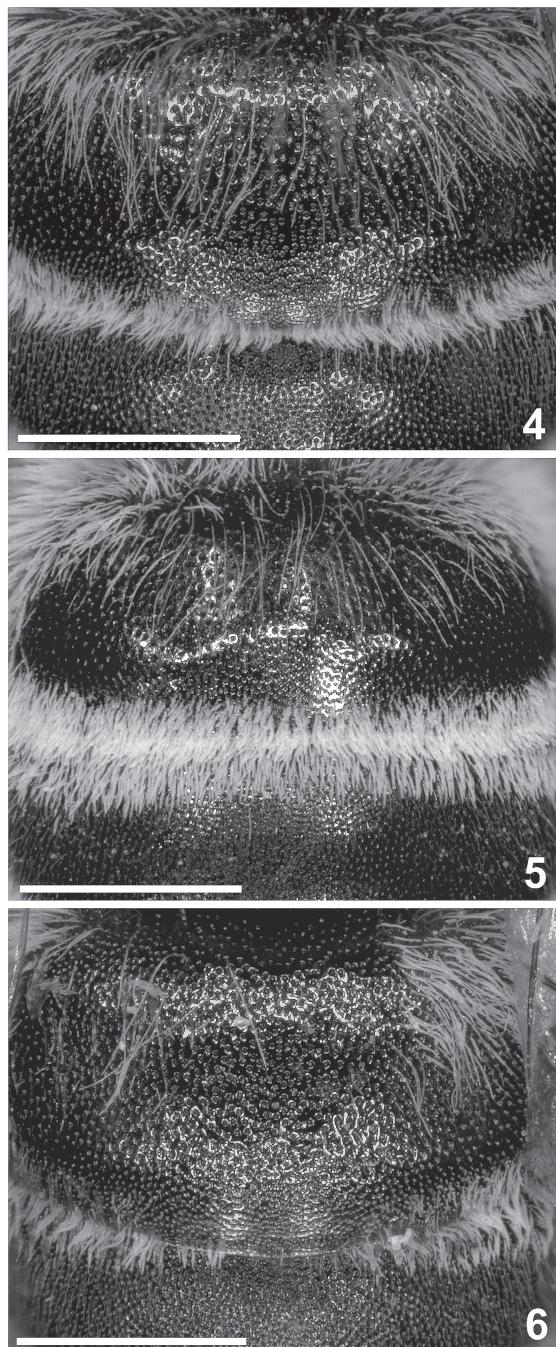
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Figs 1-3: Female clypeus. (1) *Colletes tuberculatus* MORAWITZ 1894. (2) *Colletes edentulus* NOSKIEWICZ 1936. (3) Presumed *Colletes ravulus* NOSKIEWICZ 1936. Scale bar: 1 mm.



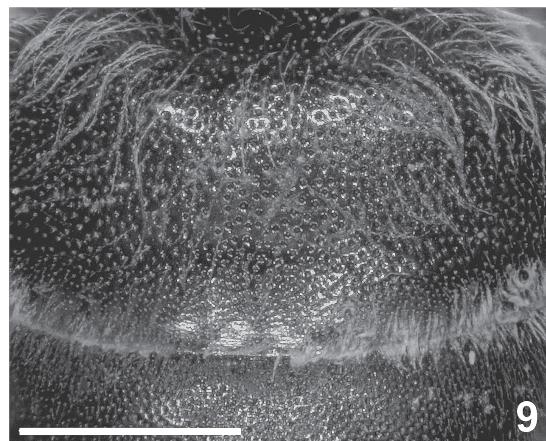
Figs 4-6: (4) Female metasomal tergum 1. *Colletes tuberculatus* MORAWITZ 1894. (5) *Colletes edentulus* NOSKIEWICZ 1936. (6) Presumed *Colletes ravulus* NOSKIEWICZ 1936. Scale bar: 1 mm.



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Figs 7-9: *Colletes indicus* KUHLMANN 2003, female. (7) Lateral view. Scale bar: 5 mm. (8) Clypeus. (9) Metasomal tergum 1. Scale bar: 1 mm.